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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------------------------------------------------------------------------|-------------|------------------------|---------------------------------|------------------|
| 10/523,396 | 04/05/2005 | Richard J.R. Alexander | 540-548 | 3724 |
| 23117 | 7590 | 01/26/2006 | | |
| NIXON & VANDERHYE, PC 901 NORTH GLEBE ROAD, 11TH FLOOR ARLINGTON, VA 22203 | | | EXAMINER KHUU, HIEN DIEU THI | |
| | | | ART UNIT 2863 | PAPER NUMBER |

DATE MAILED: 01/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|--------------------------------------|-----------------------------------------|--|
| Office Action Summary | Application No. 10/523,396 | Applicant(s) ALEXANDER ET AL. | |
| | Examiner Cindy D. Khuu | Art Unit 2863 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 and 16-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 and 16-20 is/are rejected.
- 7) ☒ Claim(s) 12-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>2/3/05 and 6/29/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification Objections

Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because it contains a legal phraseology term "comprises" (line 3) and "further comprising" (line 5). Further, the terms "Figure 3" (line 15) are irrelevant. Correction is required. See MPEP § 608.01(b).

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.

(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.

(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC

(See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or

REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)

(f) BACKGROUND OF THE INVENTION.

(1) Field of the Invention.

(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.

(g) BRIEF SUMMARY OF THE INVENTION.

(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(i) DETAILED DESCRIPTION OF THE INVENTION.

(j) CLAIM OR CLAIMS (commencing on a separate sheet).

(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).

(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

Drawings Objection

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "processor", "calibrator", "estimator algorithm", and "mathematical model" must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Art Unit: 2863

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 12-14 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 12-14 lack transitional phrases.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 12 and 13 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

With respect to claims 12 and 13, a computer program is merely a set of instructions capable of being executed by a computer. The computer program itself is not a process; hence a computer program without the computer-readable medium is nonstatutory functional descriptive material. See MPEP 2105 (III)(1)(a).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-8, 10-14, 16-18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Anderson et al. (US 2003/0184285).

With respect to claims 1 and 16, Anderson discloses a position sensor for sensing the position of an object (Fig. 3) having an associated magnetic field comprising: a first magnetic field sensing device (R_x) at a first position that outputs a first signal related to the magnetic field at the first position; a second magnetic field sensing device (R_y) at a second position that outputs a second signal related to the magnetic field at the second position (Paragraph 55, lines 1-5); a processor (100, cpu unit perform signal processing) to derive from the first signal and the second signal the most likely position of the position sensor relative to the object (Paragraph 56, lines 12-15; Paragraph 32, page 4, lines 3-8), wherein the processor comprises: a first calibrator (10a; calibration coil) to calibrate the first magnetic field sensing device (Paragraph 55, lines 5-11), thereby deriving a first measured magnetic field; a second calibrator to calibrate the second magnetic field sensing device, thereby deriving a second measured magnetic field (Paragraph 55, lines 7-11; each sensing signals are measured through calibration coil); a mathematical model (mutual inductance matrix) to determine a predicted (estimated) magnetic field at a given position relative to the object (Paragraph 57, page 7, lines 1-7); an estimator algorithm (first-order or least square algorithm) to compare the predicted magnetic field with the first and second measured magnetic fields, thereby calculating the most likely position of the position sensor relative to the object (Paragraph 78).

With respect to claims 2 and 17, Anderson further discloses a position sensor wherein the first calibrator further comprises a correction model (Paragraph 93).

With respect to claims 3 and 18, Anderson further discloses a position sensor wherein the correction model comprises a gain term (Paragraph 51) and an offset term (Paragraph 98, lines 26-38).

With respect to claims 5 and 20, Anderson further discloses a position sensor wherein the processor continually derives the most likely position of the position sensor relative to the object in real time (Paragraph 17, page 3, lines 5-6).

With respect to claim 6, Anderson further discloses a position sensor wherein during operation of the position sensor the object is separated from the position sensor by a wing skin (Paragraph 91).

With respect to claim 7, Anderson further discloses a position sensor wherein, during operation of the first calibrator, the first magnetic field sensing device is at a known position relative to the object and is separated from the object by a wing skin of predetermined thickness (Paragraph 91).

With respect to claim 8, Anderson further discloses a position sensor wherein the object comprises a cylindrical magnetic object (Paragraph 97, line 4).

With respect to claims 10 and 11, Anderson further discloses a position sensor wherein the estimator and calibrator comprises a software program (Paragraph 6, lines 17 and 18).

With respect to claims 12 and 13, Anderson further discloses a computer program executable to derive the most likely position of a position sensor in relation to the magnetic object (Paragraph 6, lines 17 and 18).

With respect to claim 14, Anderson further discloses a portable device (Paragraph 2, lines 20-24) comprising a position sensor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (US 2003/0184285) in view of Gilbert et al. (US 6,292,758).

With respect to claims 4 and 19, Anderson teaches everything claimed, as applied above, with the exception a position sensor wherein the estimator algorithm comprises an extended Kalman Filter algorithm. However, to do so is well known as taught by Gilbert. Gilbert teaches a position sensor (11) wherein the estimator algorithm (15) comprises an extended Kalman Filter algorithm (Fig. 3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to implement a Kalman Filter algorithm as disclosed by Gilbert for the purpose of employing a linear perturbation method to linearize an objective function in the neighborhood of the actual source enabling the source location to be computed in a single operation, hence lead to successive improvements in the localization result (Abstract, lines 3-8).

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (US 2003/0184285) in view of Hiligsmann et al. (US 2002/0008513).

With respect to claim 9, Anderson teaches everything claimed, as applied above, with the exception a position sensor wherein the magnetic field sensing devices comprise Hall Effect devices. However, to do so is well known as taught by Hiligsmann. Hiligsmann teaches a position sensor (100) wherein the magnetic field sensing devices (102) comprise Hall Effect devices (Paragraph 7).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to implement a Hall Effect typed sensors as disclosed by Hiligsmann for the purpose of configuring to select and/or interpolate between the sensing elements to give enhanced performance and to compensate for external mechanical factors (Paragraph 6-7).

Conclusion

The following prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Gooch et al. (US 6,618,633) and Zabler et al. (EP 0427882).

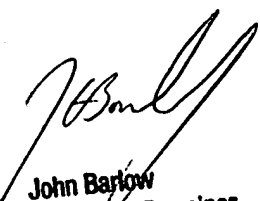
Fax/Telephone Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cindy D. Khoo whose telephone number is (571) 272-8585. The examiner can normally be reached on M-F, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Barlow can be reached on (571) 272-2269. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CME 1/19/06


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